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June 1990
SPECIAL REPORT:
The Urban Challenge

Towards a Healthier Urban Environment

By Carl Bartone

Carl Bartone

Cities currently account for two-thirds of the population growth in the developing world. By the year 2000, close to two billion people will live in sprawling urban areas such as Mexico City, Bombay, Cairo and Dhaka. While such cities play a central role in generating economic growth, uncontrolled urban expansion and industrial growth is increasingly threatening both public health and the natural environment in developing countries.

Most cities in the developing world are unable to cope with the vast amounts of urban waste produced by their people, cars and factories. In many countries less than half the population is served by sewage and solid waste collection services. Low-income groups living in non-formal settlements on the urban fringe—who make up 30 to 60 per cent of the urban population—constitute the majority of the unserved portion. They are burdened with more than their fair share of debilitating and deadly illnesses.

Rising health care expenditures and losses in productivity due to sickness from gastroenteric and respiratory diseases are among the economic costs levied on the urban poor by a poor environment. But these indicators do not adequately measure the costs in terms of human suffering and lowered quality of life. Moreover, evidence suggests they are also highly prone to chronic illnesses previously associated with developed countries, such as cardiovascular diseases and cancer.

Developing countries are already facing situations where more advanced pollution problems appear before control over traditional pollution sources is achieved. They are making the transition from traditional to modern pollution in a fraction of the time it took the industrialized countries.

City governments are severely constrained by a lack of financial and managerial resources to cope with the consequences of rapid urban growth and widespread poverty. Despite the substantial contributions they receive from central governments and the allocation of one-third to one-half of their budget to waste management services, municipalities are falling further behind in adequately controlling both human and domestic wastes and industrial pollution.

In the developing world, more than 95 per cent of urban sewage is discharged untreated into the nearest water course or field without heed to environmentally acceptable disposal methods. Municipal refuse and increasingly, toxic wastes, are disposed of in municipal sewers and open dumps. Uncollected wastes, which could be handled by safe landfills,

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Carl Bartone is senior environmental specialist with the World Bank's Urban Development Division.

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Page 18: Community yard tap in the Philippines.

Cover: Children in a low-income settlement in Karachi, Pakistan. UNDP photo by Emma Robson.

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Director:
J. Russell Boner

Editor-in-Chief:
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Executive Editor:
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Editor:
Emma Robson

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The Urban

This SOURCE Special Report analyzes the challenges facing cities in the developing world and offers examples of how communities and governments are shaping new initiatives to meet basic water and sanitation needs.

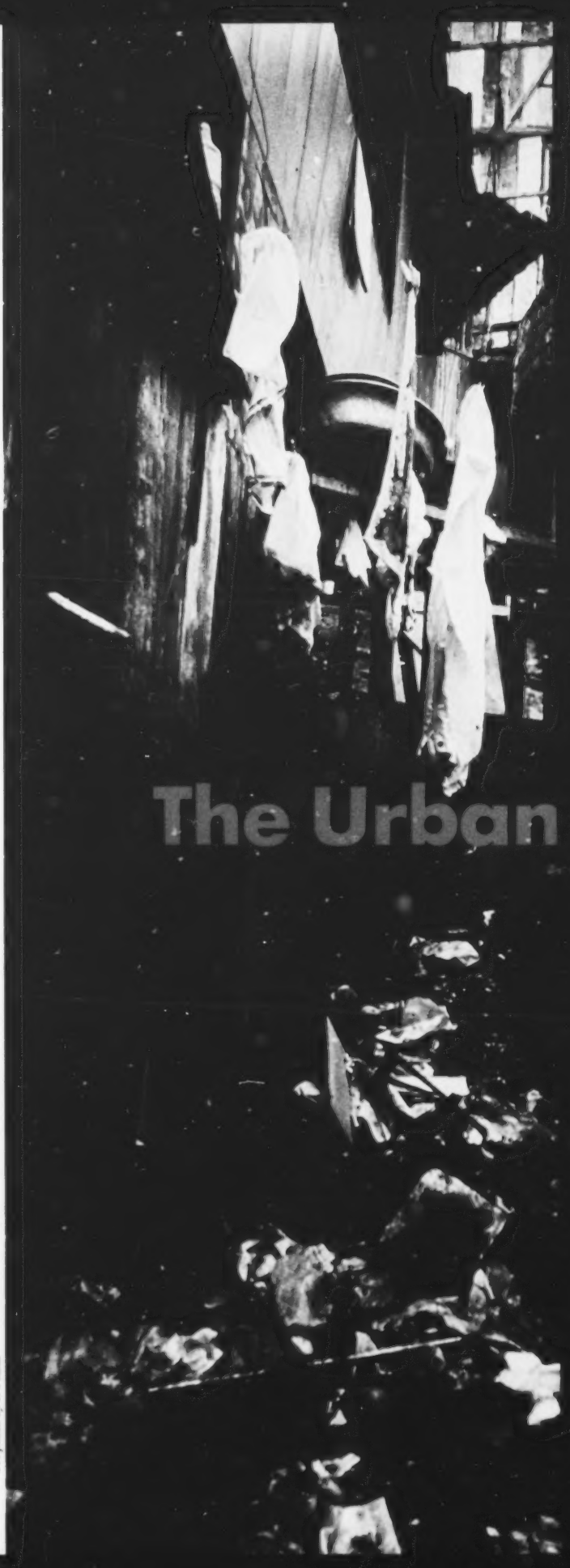
At the launch of the International Drinking Water Supply and Sanitation Decade, services in rural areas of developing countries were desperately lagging behind those in urban areas, which had benefitted from major government investments in infrastructure during the 1970s.

Thanks to a concerted campaign to address this disparity, the gap between rural and urban coverage has closed. In 1980, nearly one billion rural dwellers lacked safe water and 1.3 billion adequate sanitation. By contrast, less than 200 million urban residents lacked safe water and less than 400 million lacked sanitation.

In the meantime, however, the urban population of the developing countries has been growing far faster, at close to four per cent a year, than the rural population. As a result, there are now nearly 150 million more urban residents who lack safe water than in 1980, and nearly 30 million more without sanitation. The expansion of services in rural areas has more than kept pace with population growth.

On the face of it, urban residents still appear to be much better off than rural dwellers. The percentage of urban dwellers covered by safe water now stands at 80 per cent, and that of sanitation at 65 per cent. But the 35 per cent who lack proper sanitation and waste disposal facilities face more serious health consequences than their rural counterparts.

When transferred to congested urban areas, the practice of widespread open defecation and the dumping of rubbish and wastewater which seems harmless in remote rural areas, results in higher incidences of diarrhoea and the rapid spread of



U.N. photo by J. Frank

Challenge

diseases such as cholera, typhoid and yellow fever. In the view of Gehan Sinnatamby, a sanitation expert with the United Nations Centre for Human Settlements (Habitat), "the level of sanitation coverage in slum and informal settlements is in many cases worse than in rural areas."

Urban water supply services in developing country cities are often deficient even in wealthier districts. Shortages and interruptions of service are common, and poor maintenance of pipes during storage and transportation often leads to contamination. Of the 20 per cent classified as lacking safe water, some stand on line for hours to take a small ration from a public tap, some buy it from vendors who truck it in, while others take it untreated from rivers.

Droughts, civil strife, hunger and poverty have continued to drive rural people to seek refuge and a better life in the cities of the developing world. The slums and shanty towns where the migrants settle in some cases are growing twice as fast as the cities as a whole. Thirty-five years from now, according to UN estimates, the world's population will have reached 8.4 billion. Close to half will live in the cities of developing countries. Nearly half of those urban dwellers will be living in slums and squatter settlements. Without efforts to speed up the delivery of urban services, just ten years from now nearly 400 million city dwellers will be without a reliable water supply, while nearly 600 million will be without decent sanitation.

The urban challenge has been a major concern in the policy deliberations of the Collaborative Council—a group of over 40 external support agencies who share a strong interest in water and sanitation improvement. The issue was central at a recent meeting of regional governments and donors in Manila, hosted by the Asian Development Bank. It will also emerge as one of the fundamental problems to be addressed during the "Safe Water 2000" Global Consultation planned for September 1990 in New Delhi, India. ■

A low-income community in Brazil.

Despite her small income, this Delhi woman says she paid half the cost of her latrine for the sake of her family's health.

Lifting the Burden of India's Waste

By Emma Robson

New Delhi, India—In the 43 years since independence, India's leaders have battled to free a caste of people known as "Bhangi" from their centuries-old profession. They manually clean other peoples' latrines and carry the waste in pails on their heads to be dumped.

Mahatma Gandhi, the father of independent India, was the first to champion their cause. Jawaharlal Nehru, India's first Prime Minister, was the second. "The day every one of our countrymen and women gets to use a toilet, I shall know that our country has reached the pinnacle of progress," he said.

While safe water has been brought within the reach of millions of rural dwellers in recent years, India is still a long way from reaching Nehru's "pinnacle of progress." There are still at least 600,000 "Bhangi", or waste scavengers. They clean more than six million "bucket latrines" used by 30 million or more city dwellers. The majority of the poor living in the burgeoning slum and squatter settlements of Indian cities do not have any form of sanitation at all. "For many, open-air defecation is the only option," says Amal K. Roy, engineer and chief adviser to Sulabh International, an Indian non-governmental organization specializing in low-cost sanitation.

The absence of sanitary facilities in India's densely-populated urban areas goes a long way towards explaining why diarrhoea is the main cause of death among Indians of all ages, according to a World Health Organization survey.

To witness urban conditions during the humid monsoon season is to understand why. Thousands died when a cholera epidemic rode on the wave of the 1988 monsoon in poorer urban sections of Delhi. The rains, carrying a lethal concoction of human, animal and organic waste, swilled through the sewerless streets and contaminated the community

This river in Madras is polluted due to constant use by poorer residents who have no toilets or place to wash clothes.

UNDP photos by Emma Robson

water supply, as many of the low-lying taps through which it is distributed were submerged.

As a young engineer, Mr. Roy said he dreamed of India building the kind of city sewerage systems that were being installed in post-war Europe and America. "I had a big glamour image of high-tech sewerage and treatment plants for India," he says. "But over the years I realized that with that sort of investment in India, you cannot even recover your operation and maintenance costs."

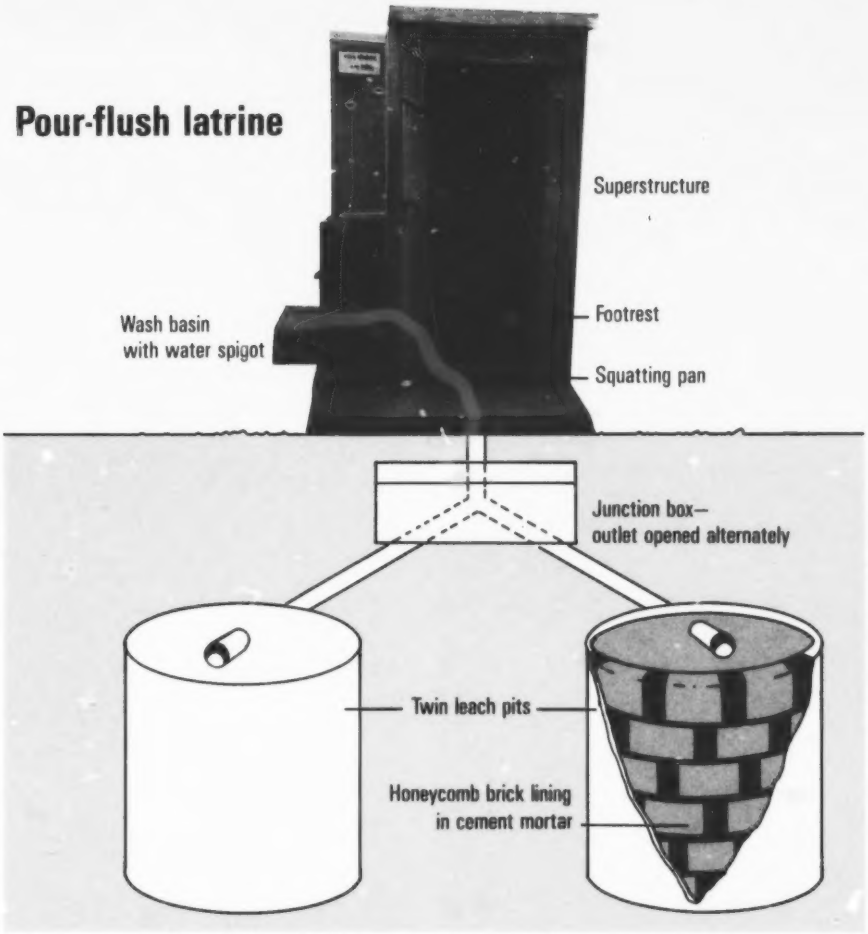
After decades of researching and promoting a low-cost solution, and persuading the government to adopt it on a national scale, Mr. Roy has finally triumphed. This year, central government is allocating US$117.5 million annually to a scheme which aims to provide 500 towns each year with sanitary, low-cost, Indian-made latrines. It is the best alternative for catering economically to the needs of India's nearly 300 million urban dwellers, whose numbers are growing four per cent a year.

The government's new commitment to the promotion of low-cost sanitation is one of the results of an international sanitation programme directed by Mr. Roy in the early 1980s. The programme, financed by the United Nations Development Programme (UNDP) and carried out by the water and sanitation programme that UNDP runs jointly with the World Bank, collected extensive data on sanitation in 211 towns across the country. The survey concluded that more than half the urban population did not have latrines. Less than ten per cent of the latrines were connected to a sewerage system, and one quarter of the population used buckets or a crude hole in the ground.

"For the first time, planners, decision-makers and engineers saw how enormous the problem was and that a low-cost solution was needed," says Mr. Roy. The technical solution they opted for was the pour-flush latrine, a design which orginated in India in the 1950s. The project produced a range of models catering to different spatial constraints and personal preferences. Ten thousand demonstration pour-flush latrines were delivered to India's states, and feasibility reports were prepared and handed to state governments. "That project changed the whole policy nationwide," says Mr. Roy. "We demonstrated that the solution, not just for India, but for the whole of the eastern developing world, was the pour-flush latrine."

Pour-flush latrines consist of a squatting pan connected to a water-filled trap, which leads to two pits through a pipe or covered drain. The waterseal feature—they are flushed manually with a jug of less than two litres of water—keeps them odour free. With an average of five users, the first pit fills up after three years, the effluent inlet is closed, and the new tank is opened up. Small holes in the pit walls allow the water to seep out, while the remaining solid residue makes a highly nourishing manure which can be safely handled after two years. The standard two-pit version costs about $100 including installation, which is about one-tenth of the cost of providing conventional sewerage.

In 1985, Prime Minister Rajiv Gandhi made improvement of the na-



This boy is building a latrine cabin in ferrocement.

UNDP photos by Emma Robson

tion's water and sanitation facilities a cornerstone of his development policy. Now, under the new government of Prime Minister V.P. Singh, for the first time states are being provided credit through the Ministry of Urban Development's Housing and Urban Development Corporation (HUDCO), to finance up to half the cost of constructing a latrine.

Indrani Sen, Director of Water Supply and Sanitation at the Ministry of Urban Development, regards the latrine programme as a compromise solution, since it does not provide for wastewater disposal. "Sewerage systems are the ultimate solution," says Ms. Sen, "but we are pushing this low-cost alternative because traditional sanitation is simply too expensive."

According to Ms. Sen, this new programme, managed by her ministry, represents the central government's first allocation of money to the states specifically for low-cost sanitation. In the past, local governments were not given a special fund for the purpose. Low-income families are required to ultimately pay half the cost of installing a latrine. They put down five per cent, pay the remainder over 12 years with the help of an easy loan from HUDCO, and the other half is paid for by central government, through the municipalities. Higher-income families are offered HUDCO loans only at commercial rates.

In order to supply the one million latrines that are expected to be installed this year, HUDCO is financing a nationwide construction training programme. Training courses organized by non-governmental organizations and local authorities will offer urban and rural workers and former waste scavengers the chance to learn a new skill and earn a living.

At the experimental community of Auroville, ten kilometres from Pondicherry in southern India, a non-governmental organization has instructed its first batch of trainees in construction of elegant, ventilated, latrine cabins in ferrocement. With grants from central government, the Overseas Development Administration of the UK and HUDCO, the Auroville Centre for Scientific Research has designed a pour-flush latrine made entirely of ferrocement which can be installed in one or two hours. "We have already sold 200 to the Pondicherry government," says Gilles Guigan, one of two project directors. "They say they need 2,000 to meet demand this year."

Ms. Sen anticipates strong demand for the latrine programme throughout India. "I think every woman, no matter how poor she is, wants a clean place to live in, a clean place for her children." ■

The Pioneers of India's Cheap and Easy Latrine

A Sulabh shower and toilet complex in Delhi.

An Indian boy brushes his teeth in a Sulabh complex.

UNDP photos by Emma Robson

Women and children can use the complexes for free.

While it was the UNDP-World Bank project that finally galvanized the government into investing in a national sanitation programme, much of the groundwork was laid by Sulabh International. This is India's largest non-governmental organization. It was originally called Sulabh Shauchalaya, which means "cheap and easy toilet" in Hindi. It was founded in the 1970s by a government employee, Dr. Bindeshwar Pathak, who was disillusioned with the empty promises of India's politicians to provide the people with toilets. The group's growth and success in drawing broad international attention prompted the recent name change.

With the support of local governments throughout India, Sulabh has freed 15,000 waste scavengers through the conversion of 500,000 "bucket privies." Sulabh and the UNDP-World Bank programme enjoyed a fruitful relationship. Sulabh benefitted from several technical refinements made under the programme, including better techniques for minimizing groundwater pollution, new design variations, and the introduction of fibre as a cheaper and more accessible alternative to traditional ceramic pans. The sanitation programme, meanwhile, learned from Sulabh's experiences in providing sanitation to the poor of Bihar state, and saw the pour-flush design as a technology suited to national application.

Another Sulabh model, aimed at providing sanitation to the poorest of the poor, did not escape the programme's attention and has now been adopted by the government as the best solution for those who are unable to pay $50 for a latrine. Sulabh builds a shower and pour-flush toilet complex on government-donated land, employs local residents as caretakers and cleaners, and asks male users to pay $0.01, which is enough to cover costs. Women and children pay nothing. Sulabh has built more than 2,000 of these complexes, which serve up to two million people a day and employ many of the former waste scavengers as cleaners.

The biggest complex in Delhi draws 10,000 people a day and makes a profit which subsidizes unprofitable complexes. Both children and adults love it. They can have a cooling shower, clean their teeth, go to the toilet, and look at themselves in mirrors as they comb their hair. ■

The Perils of Poverty in Urban Pakistan

By Emma Robson

Karachi, Pakistan—Civil servants peering out the window of Karachi's modern civic centre can spot the smoke spirals from the low-income Christian community of Issa Nagri. Officially, however, it does not exist. For to give Issa Nagri legal status would carry with it a duty to provide services. This in turn would attract more settlers to this squatter settlement of 10,000 people. So for the time being, city authorities are neither registering nor developing the illegal plot, with its wandering buffaloes and burning rubbish.

Nearly half Karachi's population of close to nine million live in such crowded *katchi abadis*, the Urdu words for unfinished settlements. Few of them benefit from paved streets, running water, or adequate waste disposal. While the poor suffer most, the city's explosive growth is affecting everyone. "It's a planners' chaos," says Memnon Siddique, a transport and communication manager for the state government of Sindh. "There are not enough schools, public transportation, or water. Even the smarter districts have to put up with a sporadic water supply because there just isn't enough to go around."

Karachi was a neatly planned city of 400,000 people, built around the country's natural southern harbour, at the time of Pakistan's independence in 1947. By 1980, its population had surpassed five million. In recent years, the Sindh capital's slum areas have been growing at ten per cent a year, twice as fast as the city as a whole.

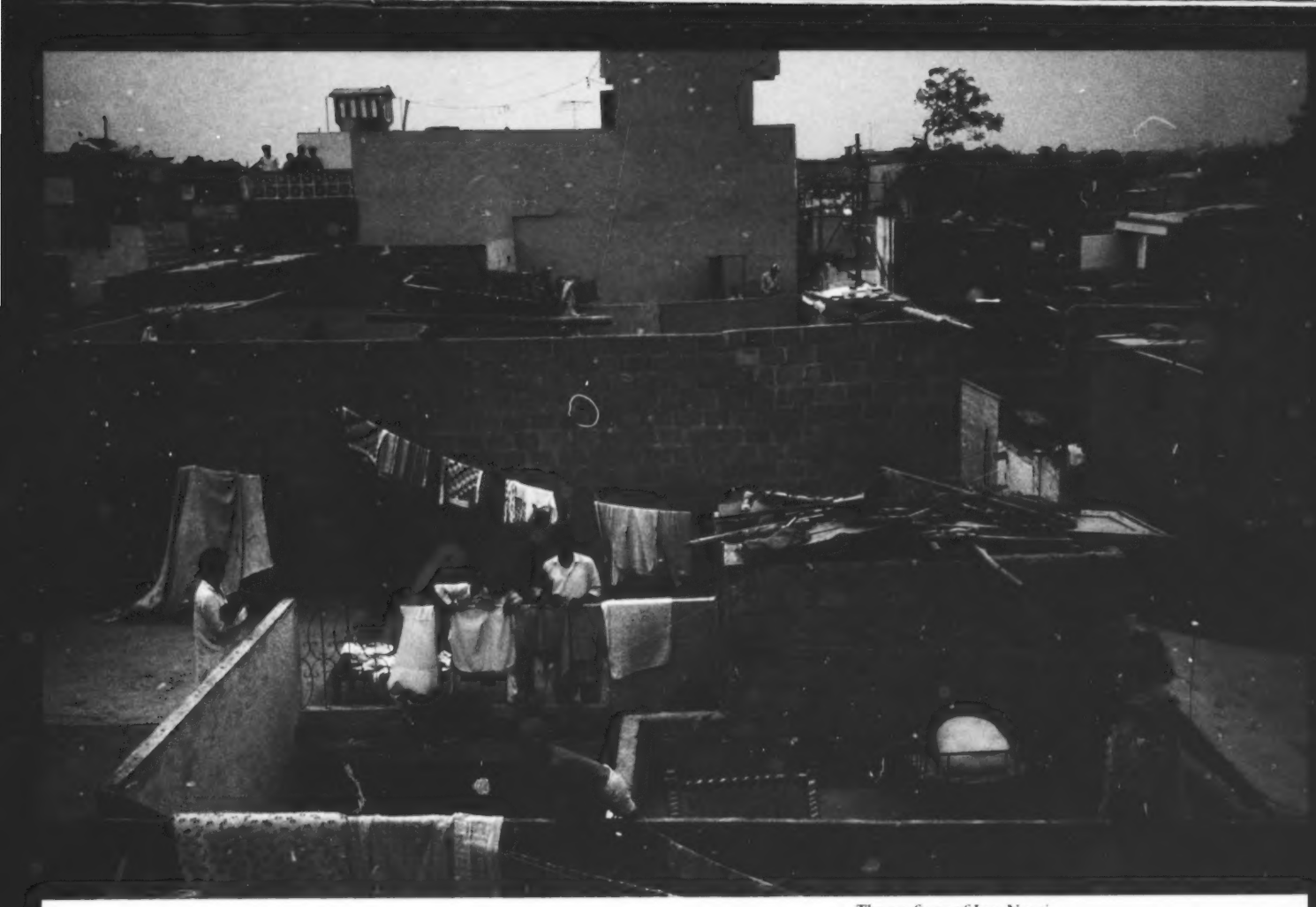
Only half of the growth is due to the natural expansion of the resident population. From north, south, east and west, more than 200,000 migrants and immigrants from Afghanistan, Sri Lanka, Iran and elsewhere have been making their way each year to this southern centre of trade and industry in search of a better life. Unfortunately, their chances of finding decent jobs and homes among Karachi's sprawling *katchi abadis* are probably worse than if they had stayed home.

The entrance to the low-income community of Issa Nagri.

Karachi's rapid growth makes it difficult to narrow the chasm between rich and poor. The increasing lack of basic infrastructure and jobs, moreover, are sowing the seeds for social unrest. It is no coincidence that the riots, which were partly fuelled by ethnic tensions, that swept through Karachi earlier this year were most serious in the *katchi abadis*. "There is an ethnic problem," says Mr. Siddique, "but it is just as much a problem of unsatisfied basic human needs."

Since independence, Karachi has attempted to pursue orderly growth through several development plans. But most of those plans have been undone by population growth. One plan prepared in 1974 with the help of a grant from the United Nations Development Programme (UNDP) and executed by the United Nations Centre for Human Settlements (Habitat), proposed an integrated community development programme for low-income groups. It resulted in more funding for poorer communities. But again the planners underestimated the ensuing influx of migrants.

Pending an official solution, several of Karachi's slums have provided facilities for themselves, with



The rooftops of Issa Nagri.

little outside help. Communities like Issa Nagri have built latrines, water supply and sewerage systems, demonstrating that much can be achieved through community initiative alone.

The predominantly Roman Catholic community of Issa Nagri, squeezed up against a neighbouring Muslim graveyard, began translating need into action two years ago. With a small contribution from the Aga Khan Foundation, the international non-governmental organization, and the tacit approval of the authorities, the community first tapped into the metropolitan water supply and installed public standposts in each lane.

Sanitation was the second priority. With an average of six people cramped into each badly ventilated room, families were aware of the importance of hygiene and owning a latrine. Moreover, the people of Issa Nagri, who largely migrated as landless peasants from Pakistan's Punjab State, had a model to aspire to. Many of them work as cleaners in the tidy middle-class appartment blocks nearby. With no outside assistance, nearly all the residents have now installed hygienic pour-flush latrines. With some logistical support from the Aga Khan University, they also built an underground drainage system which feeds to a main, open sewer now connected with the city's sewerage system. It is not well constructed—during the rainy season, drinking water, waste water and sewage all swill down the community lanes—but it is better than nothing.

In the absence of formal health services, the Aga Khan Foundation's University Medical College launched a community preventive health care service in Issa Nagri and similar communities. Families pay the costs of the services they receive, which average US$2.30 per person per year. The price is low because the service is based on a preventive strategy, involving at least one house visit a

Community workers discuss health problems in Issa Nagri.

UNDP photo by Emma Robson

The arrival of water taps in Issa Nagri has made it easier to wash clothes.

month by a health worker. Female community health workers recruited from Issa Nagri itself inquire about the health of the family, advise on treatment of diarrhoea and other illnesses, and refer family members to the community health clinic where qualified doctors can attend them. The clinic provides child vaccination, pre-natal care, and the monitoring of child growth.

Dr. John Bryant, Chairman of the Aga Khan University's Community Health Sciences Division, says such basic health units offer an inexpensive way of meeting the health needs of Pakistan's poor. Since the main contact the community has with the clinic is through health workers from Issa Nagri itself, the system is accepted by the people and as a result is effective. In five years, the child mortality rate in five out of the seven field sites where the university is working has fallen by 50 per cent to 140 per 1,000. The programme has convinced the government that the low-cost model can be implemented on a larger scale, and the World Bank has agreed to fund a nationwide programme designed by the Aga Khan Foundation.

As for the future of Karachi, its authorities are taking a new approach to planning. With continuing help from UNDP and Habitat, a new blueprint designed to meet the city's needs through the year 2000 is focusing on improving the capacity of local agencies to deliver services, particularly to the poor. With the help of improved data technology, the aim is to put in place an overall urban management framework. The project's two goals are to improve water supply and environmental conditions in the *katchi abadis*. If the plan is successful, civil servants peering out of their windows may be looking at an adequately-serviced, rubbish-free Issa Nagri. ■

Sorting Out Solutions to Waste

By Lois Jensen

United Nations, NY—"Greenwich Village Recycles," says a black and white advertisement splashed across the side of a New York City bus. Even in the United States, landfills are running out of space. And pollution-conscious Europeans worry about the effects of incineration on their once pristine skies. Waste management in the industrialized world has come into vogue.

Yet people in the developing countries have been taking garbage seriously for years. In Mexico City, 10,000 scavengers make their living—barely—on the city's dump. In Bangkok, Thailand, municipal sanitation workers double their salaries by ferreting out and selling used paper, bottles, cans and plastics. As the following report from Cairo reveals, an elaborate, century-old system of handling household refuse provides an income for 16,000 *Zabbaleen*, or garbage collectors, who recycle nearly half of the 5,000 tonnes of trash produced by that city daily.

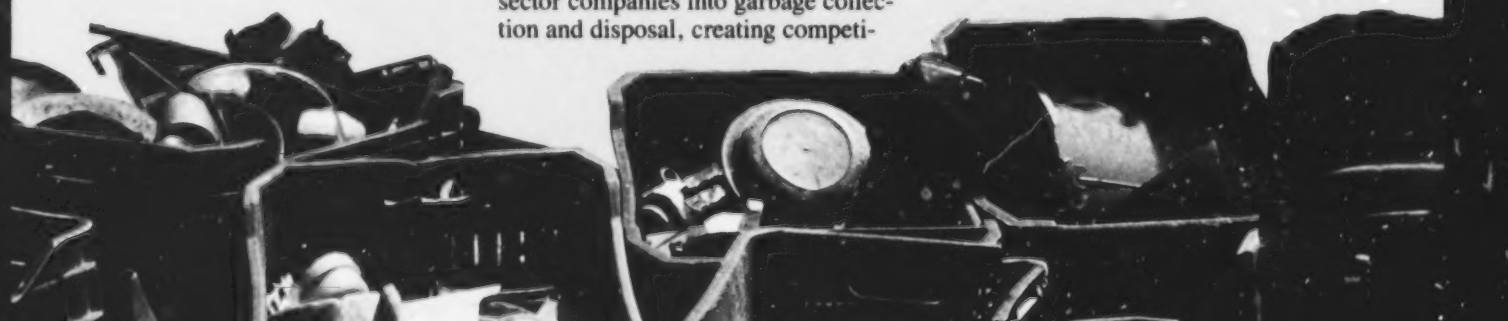
The sheer size of many Third World cities—and their runaway growth rates—makes the waste situation alarming. Collection and disposal of solid waste alone already consumes up to 50 per cent of some municipal operating budgets. And only 50 to 70 per cent of urban trash is usually collected. What remains mounts up in the poorest neighbourhoods, providing a breeding ground for rodents and disease. Or it is illegally dumped or burned, with little regard for environmental consequences.

New techniques for managing waste in the industrialized countries—from bombarding it with infrared beams to feeding it to genetically-engineered microbes—verge on science fiction. In contrast, solutions in the developing world are more a matter of experience and common sense, says Jack Fritz of the World Bank, who heads up a US$2 million global resource recovery project financed largely by the United Nations Development Programme (UNDP). Carl Bartone, another Bank official associated with the project, agrees. "Ninety-five per cent of the waste in developing countries could be handled by safe landfills, combined with the recycling that goes on anyway," he says. "The main stumbling blocks are not technical. They are organizational and institutional."

The resource recovery project, initiated in 1981 as part of the International Drinking Water Supply and Sanitation Decade, has documented a number of successful innovations in waste management and recycling around the world. Several Latin American cities are bringing private sector companies into garbage collection and disposal, creating competition and reducing inefficiency.

Community involvement is another key to extending service to low-income areas while also creating employment and keeping costs down. In Douala, Cameroon, garbage collection in certain low-income neighbourhoods is being successfully organized by communities themselves. In Medellín, Colombia, former landfill scavengers have formed co-operatives and have begun processing industrial and household wastes.

While integrating informal sector activities into the municipal system can be fraught with difficulties, it can also entail a radical shift in attitude on the part of both the municipal authorities and the lending institutions that assist them. "If you look at the loans the World Bank has made in the past in solid waste management, they have been mainly for equipment—for financing trucks and occasional composting plants—not for community-based approaches," says Roland Schertenleib, a Swiss engineer now on a year's sabbatical at the Bank. "But that is changing now. Urban administrations are simply overwhelmed. At some point, people have to begin taking charge themselves. But it will take a lot of institution building, a lot of community organizing and awareness." ■



Turning Into

Tradition Takes a New Tack

UNDP photo by Lois Jensen

Cairo, Egypt—In the steep, limestone cliffs of Moquattam Hills, at the northeastern edge of Cairo, the *Zabbaleen* have carved out a life. Besides having roots in southern Egypt, these people are linked by a common task: collecting and sorting the household garbage of one of the world's largest cities.

Manchiet Nasser is the workplace—and home—of more than 10,000 *Zabbaleen*. The air is laced with the smoke of smoldering rubbish and the odour of rotting organic waste. There is a hidden order to the chaos here. Mountains of garbage have been carefully sifted into piles of paper, plastic, glass, metal and bone.

Manchiet Nasser, and six other settlements on the outskirts of Cairo, are part of one of the oldest and most extensive recycling operations in the world. Today, this traditional system—which relies on donkey carts and thousands of small entrepreneurs who buy used materials—is being brought into the twentieth century.

The *Zabbaleen*, or garbage collectors, include two distinct groups. The *Wahis* (people of the Oases) migrated to the city from the west over a century ago. They paid landlords for the right to collect garbage and were, in turn, paid for their services by individual residents. In the 1930s, a new migration of landless farmers, mainly Coptic Christians from Upper Egypt, began assisting the *Wahis* in garbage collection. While the *Wahis* still administer the system—collecting fees from residents and maintaining their historical relationship with landlords—the *Zarrabs* (or pig breeders) do most of the physical labour. They work for the *Wahis* and earn their living by collecting, sorting and recycling trash.

Plastics are sorted by colour and washed before recycling in Manchiet Nasser.

Repeatedly pushed from their homes as the city expanded, the *Zabbaleen* have remained physically and socially on the fringes of society. Most are illiterate. Few of their settlements have clinics or schools, much less other basic services like water or sanitation. "In the past we were a despised profession," says Ahmed Moustafa El Rakabawy, who has been involved in the garbage business for over 40 years. "But that is changing now."

Today, Mr. Rakabawy is chairman of the board of directors of the Environmental Protection Company (EPC), which includes representatives from both the *Wahi* and *Zarrab* communities. The company was formed two years ago as a result of pressure from the city government, and in spite of the *Zabbaleen's* fierce resistance to change. As a *bona fide* business, the EPC won a bid to mechanize part of Cairo's household garbage collection service. Their 20 trucks now cover two residential areas where 40 donkey carts once operated—in considerably less time.

The Cairo Governorate began looking seriously at the waste problem in the early 1980s. With over ten million inhabitants growing by 1,000 more each day, Cairo's garbage was rapidly overtaking the system's ability to handle it. The *Zabbaleen* system was

unhygienic and crude, said local officials, and their donkey carts unsuitable for a city of Cairo's stature. Moreover, low-income communities—whose debris is not as valuable as that of wealthier neighbourhoods—were not being adequately serviced by the *Zabbaleen*.

The city's initial impulse was to take over the handling of household waste itself, whereby servicing of poorer communities and other problems could be worked out. Garbage would be placed in large outdoor containers by residents and picked up by municipal sanitation workers and trucks. Central facilities would be built for composting and processing recyclables.

Such was the plan. But things did not work that way, explains Mounir Neamatalla, head of a local consulting firm that has been working on the waste management issue for the last ten years. The large imported compactor trucks that the city began buying were soon breaking down,

and spare parts were difficult to find. Moreover, they were awkward on Cairo's sometimes narrow streets, and were designed to compact European waste, not Egyptian refuse, which is far more dense.

But the main stumbling block was money. "Apart from the initial investment, no one anticipated the exorbitant cost of keeping these trucks and plants operating over the years," says Mr. Neamatalla. "When the city realized it would cost at least US$57 million a year to run a municipal waste system—which is the total operating budget of the city at present—it became clear that alternatives needed to be found."

Aside from the cost, centralization of recycling could have wiped out thousands of workshops and small industries scattered about the city. Through the *Zabbaleen*'s network of middlemen, these businesses receive regular supplies of cheap paper, plastic, metal, glass, textiles and bone from which other products are made. Up to 500 factories in Cairo alone use recycled—rather than primary—polymers, which are about half as expensive.

"The various transitions that waste goes through before it reaches the end user are links that cannot be broken or easily substituted," says Mr. Neamatalla. "To centralize such a system would never work."

Once convinced about the value of their services, the city agreed that the *Zabbaleen* should be given a chance to modernize. A contract was awarded to the newly-formed Environmental Protection Company for a trial period, and new routes were mapped out. At the same time, the city offered contracts to other private sanitation companies, which were given free access to city landfills for dumping as an incentive.

In the opinion of Mr. Neamatalla, the decision was a wise one. While other companies have not been able to beat the *Zabbaleen* in terms of cost or efficiency, they are a source of competition, which has spurred other *Zabbaleen* into action. In the last six months, more than ten new *Zabbaleen* companies have been launched.

Trash mounts up in Torah, a Zabbaleen settlement that has not yet received outside help.

Four-storey brick homes have replaced tin shacks in Ma

UNDP photos by Lars Jensen

While many *Zabbaleen* are unhappy with government pressure to mechanize, the use of new, specially designed trucks, manufactured domestically, are safer in heavy Cairo traffic than donkey carts. And children who used to guard the donkeys on their father's daily routes are now free to attend school.

Full integration of the *Zabbaleen* into the municipal sanitation system will still take another three to five years, says Mr. Neamatalla. And it is a transition stage—not without risk. Nevertheless, a major transformation has already occurred. The government now accepts the fact that the informal sector has a role in the upgrading process. And the *Zabbaleen* themselves have made a psychological leap.

"They know now that they can do it, and that they are perceived as an important part of the system," says Mr. Neamatalla. The tough part is over." ■

t Nasser.

This workshop in Manchiet Nasser produces stuffing for mattresses, comforters and furniture from rags.

Paving the Way for Change

Built with support from UNDP's Partners in Development Programme, the Integrated Care Centre in Manchiet Nasser offers health services, a kindergarten and literacy classes for women.

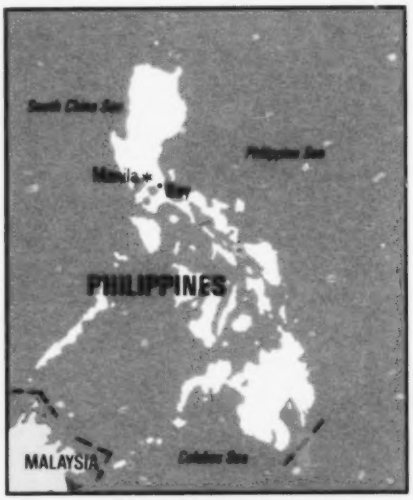
Opportunities for education, and other improvements that made them feel part of the larger Cairo community, were the catalysts for change among the *Zabbaleen*. These improvements began in Manchiet Nasser in the early 1980s, as part of a city-wide beautification campaign and a large, urban upgrading programme financed by a World Bank loan. What has been described by many as a fiery vision out of hell was slowly transformed. For the first time, these squatters were given rights to their land. Roads appeared amidst oceans of trash. A community clean-up drive was initiated and water, sewerage and electricity were installed.

Today, with help from the Ford Foundation, Oxfam and a number of Christian charities, Manchiet Nasser is a beehive of activity. Four-storey brick homes have replaced many tin shacks. Schools and health clinics have opened. And hundreds of workshops are now processing waste. Scraps of fabric are woven into rugs. Plastics are sorted, granulated and poured into moulds to become battery containers and other finished products. Organic material not suitable for pigfeed is turned into high-grade compost, and sold for use in reclaiming desert lands.

With Manchiet Nasser as their model, other *Zabbaleen* communities have requested similar assistance. The city is now negotiating with a second *Zabbaleen* settlement at Torah to provide secure plots of land. ■

Water for Small Towns

Philippines Pioneers Low-cost Solutions



By David Kinley

Bay, Philippines—Clean, safe drinking water was once enjoyed only by the privileged in this small town hemmed by rice fields on the south shore of Laguna Lake, ninety minutes' drive south of Manila. But now, thanks to a newly designed low-cost water system and a promotional campaign which awards prizes to good customers, even the poorest in this community of 6,000 are benefitting from an affordable supply of fresh groundwater.

As in much of the Philippines, the better-off families of Bay could afford to sink their own deep wells and install motorized pumps and home storage tanks. But such private water systems remained far beyond the means of the low and middle-income people who make up the town's majority. Many residents dug shallow wells near their homes and equipped them with crude handpumps. But this water was of questionable quality. And in the crowded squatter settlement known as Maitim—the Tagalog word for dark—water was not only dangerous, but a daily burden. The day labourers and tenant farmers residing in this shanty town were resigned to carrying plastic jugs of water from distant and poorly protected shallow wells, or purchasing water at high prices from tanker truck vendors.

All this has changed in the last three years due to the efforts of the Local Water Utilities Administration (LWUA) and the Laguna Water District. With US$150,000 from the United Nations Development Programme (UNDP), a fundamental redesign of conventional distribution systems has been successfully tested. Moreover, the new low-cost piped water scheme is now being replicated with World Bank financing in some 40 similar towns all across the Philippines.

The LWUA is the government corporation charged with financing local water utilities outside of Metro Manila. In the past, it was successful in helping to build numerous municipal water systems patterned after

UNDP photo by David Kinley

Children in the squatter community of Maitim.

those of developed countries. But these conventional designs have limitations in many parts of the Philippines.

"As LWUA became more involved in serving smaller population centres in the 1980s, feasibility studies showed that many proposed systems for poorer communities were not economically viable," says Roberto Binag, an engineer with LWUA. "The challange facing LWUA was to bring down costs enough to make the new water systems affordable."

The community of Bay was chosen for the pilot experiment precisely because previous studies undertaken by the Laguna Water District had shown that the town could not afford a water system built to conventional standards. Thus, LWUA engineers began revising both system design standards and construction methods to cut expenses.

Key features of the new low-cost system include using small diameter distribution pipes, lowering system pressure, eliminating emergency

water storage, and use of locally manufactured pipes, valves and fittings. A mix of services is offered including house connections, yard taps and public faucets. Local labour teams are employed instead of conventional contractors. The combined use of cheaper local labour and reduced material expenses brought down the average cost of supplying a customer from $45 under the old system to just $25, nearly a 45 per cent saving.

Like the private water systems in the area, the source of the new Bay water system is a deep tubeweli with an electric powered pump, backed up by a diesel generator. An existing elevated steel tank was refurbished to provide storage and pressure to move water through the system and a gas chlorinator was installed to purify the water entering the system.

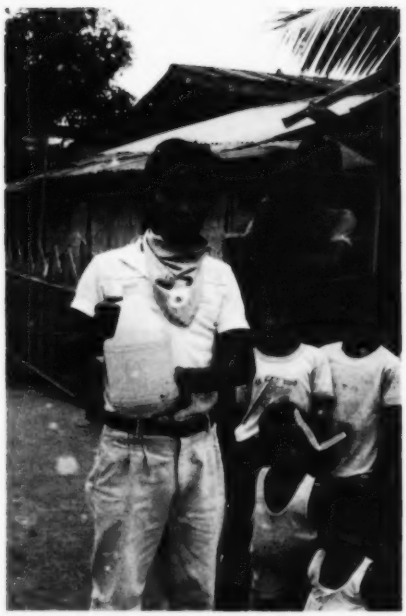
Each potential customer was given a choice about what level of service would be provided. A direct connection to the house cost 1,200 pesos (about $50) plus a monthly charge of 3.80 pesos ($0.18) per 1,000 litres for the consumption of the first 10,000 litres of water. Beyond 10,000 litres per month, the unit charge rises, thus encouraging conservation. People choosing service through a yard tap pay no connection fee and the same monthly rate as those with house connections. Those utilizing public taps pay ten centavos (less than half a US cent) per 20-litre can, a small fraction of what they used to pay vendors.

In little more than three years, an estimated 6,000 people are using the new water system through 180 yard taps, over 700 house hook-ups and a half-dozen public taps. Community

Top: Meters are attached to all hook-ups, including public taps.
Middle: A LWUA engineer installing a public water tap in Maitim.
Bottom: LWUA Project Manager Roberto Binag checks the public tap in Maitim.

UNDP photos by David Kinley

Orlando Tayson (centre), a bus driver, now has water piped into his home.



A young water tap caretaker from the Alagdon family in Maitim.

acceptance of the new system was stimulated by a publicity campaign carried out by the local water authority. "We went around to many neighbourhoods showing them samples of their untreated drinking water," says Pantaleon Tabanao, General Manager of the Laguna Water District. "When they saw that there was coliform bacteria in the samples, they were interested in connecting to the new system."

The financial viability of the Bay water system has been reinforced by a very stringent system of user payments for water services. A surcharge is levied for late payment of water bills, while incentives have been created for timely payment. "We built up a reserve fund during the first year of operation, then began offering prizes through a lottery open to all who paid on time," explains Mr. Tabanao. "When we started awarding rice cookers, electric irons and other prizes to our good customers, everyone learned the advantages of paying on time."

A stroll down the lane through the squatter community of Maitim reveals just how much the new system has changed people's lives. Next to the home of Mr. Oliver Alagdon, a day-labourer, a concrete public water tap stands next to the old open well that used to be the neighbourhood's main water source. From dawn until 7 pm every day, Mr. Alagdon and his family serve as the fee collectors at this tap. Mr. Alagdon was elected to be the caretaker by the 100 people living nearby.

A short distance past the public tap stands the clean but simple block home of Orlando Tayson, a bus driver in Los Baños and father of five. "My neighbours and I used to rely on a simple handpump for all our water needs," says Mr. Tayson. "Now I pay 40 pesos a month for my yard tap which is connected by hose to my kitchen sink and bathroom shower." ■

Elephantiasis, the Urban Migrant's Nemesis

Madras, India—Kathiresan Saraswathy, mother of six, painfully adjusts her heavy, grotesquely deformed left leg on the hospital bed. She smiles feebly as she explains in her native Tamil the relief she will feel when her long ordeal is over.

As a teenager, Mrs. Saraswathy, who migrated from Sri Lanka to a poor district of this southern city, developed a slight temperature and swelling in her leg. Work, poverty and family obligations prevented her from seeking medical help. So she struggled through the bouts of fever that accompany her disease and watched the leg enlarge, the skin turn leathery and the flesh grow hard, black and knobbly. At 42, after she could no longer walk or do housework, she was admitted to the plastic surgery ward of the old, run-down Madras General Hospital.

Mrs. Saraswathy developed elephantiasis through years of living without adequate sanitation.

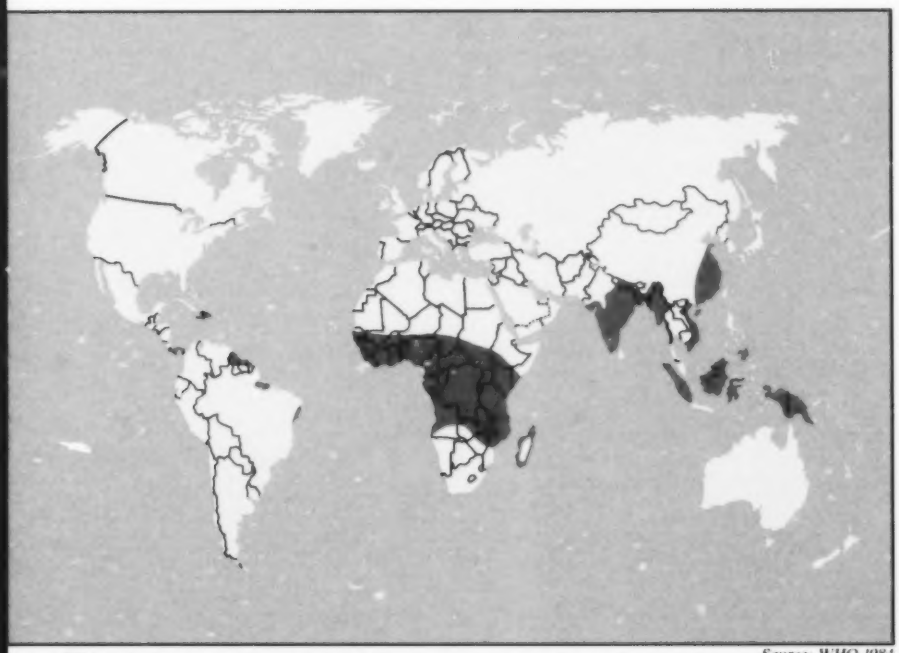
Mrs. Saraswathy is one of more than 90 million people world-wide who suffer from lymphatic filariasis, a disease which can lead to elephantiasis, named after its resemblance to the leg of an elephant. The World Health Organization (WHO) estimates that over 900 million people are at risk of contracting this mosquito inflicted illness. Endemic areas are found in Africa, Asia and the Pacific, and small pockets of Latin America and the Caribbean.

There are 23 million sufferers in India alone, and an estimated 16 million like Mrs. Saraswathy who have developed chronic manifestations of the disease. But Mrs. Saraswathy's leg will be restored to almost normal in a series of surgical operations which take an average of three weeks to complete. For the other victims, there is little hope, since there are only two plastic surgeons in India who perform the complex operation and skin grafts required.

One of those surgeons, Dr. Sabbu Rajendra, based at the Madras hospital, says that between repairing cleft lips and mending victims of road accidents, he manages to fit in one filariasis operation a week. "Many people need treatment," says Dr. Rajendra. "They hobble in on their enormous legs, but I have to turn away all but the most advanced cases."

There are two vectors, or carriers, of the disease. In urban areas, where over 90 per cent of the cases originate, lymphatic filariasis is caused by repeated biting by the female *Culex Quinquefasciatus* mosquito. The mosquitoes release the infective larvae—microscopic worms—of the parasite *Wuchereria bancrofti* into a human body. In rural areas, the infection is caused by bites from the *Anopheles* and *Mansonia* families of mosquitoes. The adult worms live in the body's lymphatic system and make their home in the lymph nodes. As they grow, they block the lymph vessels and cause a build up of lymph fluid in the limbs, which can ultimately result in elephantiasis.

Researchers of the disease describe



Distribution of lymphatic filariasis

Source: WHO 1984

the transmission process as highly unpredictable, for not all people exposed to several years of biting by infective vectors develop the symptoms. But they can, as carriers, pass on the parasite to other mosquitoes which in turn infect other humans.

The operation Dr. Rajendra performs is called a nodovenous shunt, a technique first used to treat elephantiasis by his teacher, Professor S. Jamal of Tanjore, southern India. The operation involves making an incision—usually in the groin—and connecting the infected lymph node to the saphenous vein. This vein drains away the excess fluid through the kidneys, and the swelling goes down. The surgeons then remove the wizened, swollen flesh, and graft healthy skin in its place. Elephantiasis most commonly affects the legs. But it occasionally attacks the breasts and genitalia. "That can be very painful and those cases require very delicate surgery," says Dr. Rajendra. "Sometimes, amputation is the only solution, which is tragic."

But the real tragedy is that 23 million Indians are suffering from a preventable disease. Firstly, areas with adequate drainage and waste disposal facilities present few opportunities for mosquito breeding. Secondly, if detected in its early stages, lymphatic filariasis can be cured with drugs alone. Dr. Pradeep Das, a deputy director at the Vector Control Research Centre in Pondicherry, south of Madras, sees the spread of the disease as a symbol of the urban migration and population expansion now overwhelming India's cities.

Elephantiasis is the urban migrants' nemesis. The parasites are carried by people who settle in the overcrowded, poorly-serviced slum settlements which proliferate in and around the cities of the developing world. The abundant pools of stagnant, polluted water found in many poor urban settlements are the favourite breeding ground of the *Culex Quinquefasciatus* mosquito. "In poor urban areas, the government may construct a drain, which is often just a trench with no outlet and no water treatment plant," says Dr. Das, "so you find mosquito breeding grounds of gigantic proportions." The disease is less prevalent in rural areas since water is scarcer, percolates more easily into the ground, or is reused to irrigate small plots.

Given the rate of urban growth in India and other developing countries, Dr. Das believes that, if not checked, the disease could grow to alarming dimensions. The Pondicherry centre conducted a five-year demonstration project in the area which, through drainage and sanitation improvements alone, reduced the mosquito population to very low levels.

But just bringing down the vector population will not interrupt transmission completely. The small worm-like parasites, or *microfilariae*, survive in humans for at least five years. "So even if there are no mosquitoes left and no people with symptoms of filariasis," says Dr. Das, "it doesn't

UNDP photo by Emma Robson

This Pondicherry community has water, but is at risk of developing filariasis because of its lack of adequate drains.

mean you have eradicated the disease."

The Pondicherry centre advocates an integrated control approach combining sanitation improvements, the use of environmentally safe insecticides, and early detection and treatment of the disease. "In the early stages, the disease can be reversed by using an anti-inflammatory drug," says Dr. Subhada Pani, who researches treatment of early symptoms. More advanced stages can be treated with the drug diethylcarbamazine (DEC), which kills the microfilariae, but whose side effects discourage people from taking the two-week course.

The organization's affiliated centre in the state of Kerala is field-testing an alternative to DEC. Its work is being financed by the Special Programme for Research and Training in Tropical Diseases, funded by WHO, the United Nations Development Programme (UNDP) and the World Bank. The new drug being tested is ivermectin, whose effectiveness in checking river blindness marked an important breakthrough for the millions of Africans who suffer from this disease.

Ivermectin, a product of the pharmaceutical company Merck Sharp and Dohme International, substantially reduces the number of microfilariae in the patient. It is taken in the form of one tablet, once a year, and has minimal side effects. "Ivermectin appears to be the best drug for filariasis," says Dr. Das, "but we are still awaiting the final results."

The Centre's researchers have also tested a new biocide for the Tropical Diseases Research programme. The substance kills the mosquitoes while sparing the majority of other insects in the ecosystem.

Initial results of the performance of both these new tools appear positive. But Dr. Das is pessimistic about India's ability to control the disease, given all the different measures necessary and India's limited financial and human resources. Scientists attached to WHO, in contrast, are more optimistic. "Effective control is tricky," says Dr. Philippe Ranque, a WHO specialist in filariasis, "but if governments adopt an approach which combines changes in human behaviour, use of mosquito nets, environmental measures, and the new drugs, it is not impossible."

—Emma Robson

UNDP photo by Emma Robson

This carp is expected to reach 20 kilogrammes, fattened exclusively on the polluting algae.

Chinese Carp Fight Reservoir Pollution in Morocco

Rabat, Morocco—To combat pollution and reduce treatment costs of its main drinking water reservoir, Morocco has been testing several techniques, including the successful use of Chinese silver carp to control algae.

Morocco's reservoirs suffer from eutrophication—the multiplication of microscopic surface algae, or phytoplankton, due to an over-abundance of nitrogen and phosphorus. When the algae die, they rob water of oxygen as they decompose and create nitrogen, ammonia and hydrogen sulphide—pollutants which add to treatment costs. Chinese silver carp feed almost exclusively on phytoplankton and thrive in warmer climates.

"Our reservoir was getting very polluted by algae," says Abderrahmane Bouloud, a biologist who manages the carp activities for Morocco's National Office of Drinking Water (ONEP). "These fish eat algae, and fisherman can eat the fish. It is an ideal arrangement."

In an experiment launched in 1987, 1.8 kilogrammes of silver carp fry were introduced into the Sidi Mohammed Ben Abdellah reservoir on the outskirts of Rabat, which supplies four million people along the Atlantic coast from Rabat to Casablanca.

The experiment was part of a project supported by the United Nations Development Programme (UNDP) and World Health Organization (WHO). Its aim was to find low-cost solutions to Morocco's eutrophication problem. Eutrophication is a problem which has been closely analysed in temperate climates, particularly Scandinavia. But little research has been conducted in semi-arid and arid climates. The WHO-appointed experts from Sweden, Denmark and Canada were applying their northern knowledge to different and more complex conditions.

Dr. Richard Vollenweider, a Swiss expert who worked on the project on behalf of the Canadian National Water Research's Centre for Inland Water, says he believes Morocco's use of fish to purify a drinking water reservoir was a first for a warm country.

Eutrophication often stems from the discharge of domestic sewage or industrial effluents, as in the case of the algal bloom in the Adriatic Sea in summer 1989. In Morocco, it is caused by a surplus of chemical fertilizers which are swept off the treeless banks of the reservoirs by rainwater. While it is a problem which afflicts temperate climates usually only in summer, many artificial lakes in tropical, semi-arid and arid climates suffer from eutrophication all-year round.

The problem in the Rabat reservoir was most severe during the warmest months of the year, when treatment costs rose considerably. "Even with treatment, it was difficult to remove a nasty rotten egg taste," says Dr. Houssain Abouzaid, in charge of national water quality control at ONEP.

During the recent experiment, scientists conducted several water tests each week and studied the behaviour of the fish, which were suspended in cages in an arm of the reservoir which was cleared and partitioned for tests. Findings were compared with a similarly partitioned control area of the lake where there were no fish. In the arm containing the fish, levels of oxygen rose, par-

Biologist Abderrahmane Bouloud regularly monitors the water in the reservoir.

ticularly in the lower reaches, and light penetration increased as the algal mass diminished. "We also opened the fishes' stomachs periodically and found that, indeed, they were eating the algae," says Mr. Bouloud. Combined with another project recommendation—the selection of water from depths containing the least pollutants and most oxygen—the net result was dramatically lower water treatment costs.

Silver carp grow fast in warm waters and make a nutritious meal. Released into the reservoir in November 1987 when they weighed only 25 grammes, they weighed in at five kilogrammes after one year. In two years they weighed between eight and nine kilos. They are expected to finally tip the scales at 20 kilos apiece, fattened almost exclusively on the enemy algae.

Controlling the fish biomass in the reservoir is important to maintain a constant rate of purification. At a later stage, ONEP plans to restock the reservoir with more fry, but until now has relied on the growing food demands of the existing carp, which need running water to reproduce. Local fishermen overfished the reservoir in 1988, and the Ministry of Agriculture's Department of Waters, Forests and Soil Conservation banned fishing in the 1989 season at ONEP's request. "The fishermen were getting around US$6.50 a kilo and were very happy about it," says Mr. Bouloud.

"In countries with a continuous water supply, the diversion of polluted water is a valid option," says Dr. Vollenweider. In the 1960s, for example, Lake Washington in the United States was affected by serious eutrophication. Sewage treatment plants were constructed and the contaminated water was diverted by pipeline and purified. "This was impossible in the case of the Moroccan reservoir, which needs its six weeks a year of heavy rain to fill it." Artificial aeration of the reservoir water was also ruled out as being too expensive in Morocco's case. "The use of silver carp was the simplest and cheapest solution," says Dr. Vollenweider.

Due to the success of the experiment, ONEP plans to introduce carp in ten other reservoirs also suffering from eutrophication. The experiment could also serve as a model to other semi-arid and arid countries. Indeed, Mr. Bouloud has already visited Algeria and Tunisia to explain ONEP's experience.

—Emma Robson

A technician tests water for chemical substances.

UNDP photos by Emma Robson

British cyclists raise money for WaterAid's projects in developing countries.

Rallying Voluntary Support for Southern Aid

Three biologists canoed 240 kilometres down the river Severn in England last year to raise US$340 for charity. An Englishman from Bristol dieted, lost 44.2 kilogrammes and raised $1,500. A cyclist from Wessex pedalled the length of Great Britain in just 57 hours, raising nearly $3,400.

If presented with a good cause, "northerners" will perform unusual feats to help people in poorer countries. Interestingly, the donations of these individuals went neither to famine victims in Ethiopia, nor flood victims in Bangladesh, but to water and sanitation projects in Africa and Asia.

Raising funds for a cause that isn't making headlines, such as water and sanitation, takes hard work and imaginative campaigning. This is something which the British charity, WaterAid, is exceptionally good at. "The public has responded to the approach of our development projects," says Bridget Phelps, who is in charge of fund-raising. "They like the fact that we emphasize a self-help approach and tailor our projects to the local situation."

The sportsmen and women are a good source of publicity, but just one source of WaterAid's income. The British who prefer to confine their physical efforts to watching television are welcome to make voluntary monthly payroll contributions of up to $68, down to as little as $0.85. More than 20,000 employees in the British water industry are giving in this way.

But WaterAid's single largest source of income comes from the more than 100,000 British consumers who respond to appeals they receive inside their water bills. In those appeals, WaterAid explains the water, sanitation and health needs of communities in which it works in nine low-income countries. It asks water consumers to round off their bills to the nearest pound sterling, or make outright donations.

Thanks to Britain's water users and

to active campaigning by WaterAid committees formed by the employees of more than 20 British water authorities, in eight years the charity has raised its total annual budget one hundred-fold. Contributions rose from $42,500 to $4.25 million. About one quarter of the total is donated by the UK government, which matches WaterAid grants to selected water and sanitation projects.

WaterAid was established in 1981 as a contribution of the British water industry to the International Drinking Water Supply and Sanitation Decade. From the outset, the head office of Britain's ten major water authorities provided WaterAid with free office space, and many of the water companies agreed to distribute leaflets along with customers' water bills.

This industry link-up, which has since expanded to include authorities from Scotland and Northern Ireland, offers a wealth of water and sanitation professionals who are prepared to work for WaterAid on a voluntary basis, both at home and in the field. "We have an ideal set-up," says David Collett, director of WaterAid. "We have on board a number of experienced and dedicated engineers who give technical advice to the local grassroots organizations we support in developing countries." One condition is that the field-workers have some developing country experience. "Your water expert from Glasgow is not necessarily the right person for a community water supply project in Tanzania," says Mr. Collett.

Thanks to the water industry's support, WaterAid's overheads are very low. "We are able to use about 90 per cent of our budget on project activities in nine low-income countries in Africa and Asia," says Mr. Collett.

WaterAid's success has not gone unnoticed in other industrialized countries. It was the inspiration behind the creation of WaterCan in Canada in 1987, which has since grown into an organization that spends $186,750 a year on water and sanitation improvements in more than 20 countries. Unlike WaterAid, WaterCan does not execute projects itself, but works through several Canadian agencies with long experience in the developing world. Its main objective is to raise money for water and sanitation activities by increasing Canadians' awareness of developing countries' needs and appealing to their own concern for the environment.

WaterCan has had a harder time getting launched than WaterAid. Canada's water and sanitation industry is highly fragmented. While the majority of water utilities are owned by municipalities, some are owned by provinces and others are private. With a generous start-up grant from the Canadian International Development Agency (CIDA) and endorsements from many local Members of Parliament, WaterCan began to attract Canadian municipalities one at a time, approaching 375 cities with populations of more than 10,000.

WaterAid

Racing cars and smiling volunteers attract funds for WaterAid of Great Britain.

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By this year, the organization had enlisted the support of 55 municipal water utilities. More than 600,000 leaflets are sent out each year, generating over $104,000 in cheques to WaterCan. The rest of WaterCan's budget is made up by non-governmental organizations, private foundations and CIDA, which matches the water bill donations.

WaterCan's Executive Director, Nancy Pawelek, is also pinning great hope on raising funds through new private sector initiatives, following a successful recent campaign which appealed to the environmental awareness of Canadian shoppers. Under the terms of a limited partnership with Chevron Chemical (Canada), more than 600,000 WaterCan leaflets were distributed in samples of environment-friendly cleaning compounds produced by a small company called The Soap Factory and marketed by Chevron. "We're trying to marry the idea of helping people in developing countries with Canadians' own concerns about the need to preserve the integrity of Canada's water supplies," says Ms. Pawelek.

The bio-degradable washing and cleaning liquids were test-marketed in major supermarket and drugstore chains of Western Canada in late 1989 and the response was very positive. "The Soap Factory received more orders from retailers than they could fill," says Ms. Pawelek, "and the good thing is that WaterCan received one per cent of the proceeds of all retail orders."

The agreement is one that benefits all partners—consumers, retailers, industry and WaterCan. "For a company like Chevron to be associated with safe water and helping the Third World is tremendous publicity," says Ms. Pawelek. "For us it's a great opportunity to reach people we could not otherwise have reached."

Hopping on the back of environment and health conscious consumers may be the wave of the future for development organizations that rely on private fund-raising. "It is a great way of raising money all year round," says Dominique Renaud, marketing director for Eau Secours, a mineral water launched last year by Oxfam Canada through bottlers Les Breuvages Nora. "Mineral water is very popular in Canada. In buying Eau Secours, people are getting a very good product at a standard price and helping Oxfam," she says.

Gaston Truchon, director-general of Oxfam Canada, says he expects sales of 2.4 million litres this year, which should raise $208,000 for ongoing water projects in Mali and Burkina Faso. The water, sold in 1.5 litre bottles, costs between $0.65 and $1.07, depending on the retailer. Oxfam has already persuaded petrol stations in Quebec to sell the water and is negotiating through its US, UK and Belgian counterparts to sell it in those countries. "We are dealing with this as a private business," says Mr. Truchon, "and it is going quite well." ■

LOOKING AHEAD:

Continued from page 2

end up in nearby drains or streets, where they cause flooding and provide breeding sites for disease-carrying insects and rodents.

The wastes from larger industrial facilities spread from the workplace to the city's environment and beyond. But those from small-scale manufacturing—which constitute a major source of hazardous wastes in developing country cities—are often overlooked. Workers in these small industries, many of which are located in low-income neighbourhoods, are exposed to inadequate lighting and ventilation, little protection from machinery, excessive noise, toxic chemicals and dust.

Rapid expansion of water and sanitation services and increased support for pollution control programmes must become urban environmental priorities. National governments must take a strong role in establishing meaningful environmental standards, and provide the technical assistance, training, and financing for their burgeoning cities. Achieving a better urban environment

will largely depend on stronger local service institutions, better urban land management and municipal finance, and increased resources for municipal waste treatment and disposal operations.

The Urban Management Programme, supported by UNDP, the World Bank and the United Nations Centre for Human Settlements, is attempting to address the growing challenges in land management, infrastructure development and municipal finance faced by developing countries' cities. One element focuses on urban management and the environment. Managers and decision-makers are given guidance on appropriate methods of environmental planning and management of urban areas. Emphasis is placed on environmental issues that concern local governments, particularly on those issues affecting the urban poor, women and children. The project is now preparing a strategic framework aimed at helping authorities to deal with urban waste management and other environmental problems. ■

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URBAN WASTE MANAGEMENT

SOLID WASTE MANAGEMENT WITH PEOPLE'S PARTICIPATION: AN EXAMPLE IN NEPAL
By Dieter Nicolaisen, Ursula Plog,
Eckhardt Spreen and Sashi Bahadur Thapa
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A case study of the successful Solid Waste Management Project carried out in the Kathmandu Valley during the 1980s with technical and financial support from Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ). The programme features development of waste collection, disposal, recycling, composting and sanitary landfill facilities for solid wastes in Kathmandu, Patan and Bhaktapur.

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An overview of the growing problems of solid waste management in the developing world along with a comprehensive guide to the selection and use of solid waste collection vehicles. The report provides technical information for the design and manufacture of alternative vehicles which can be produced locally and are more cost-effective than conventional designs used in industrialized countries.

New Delhi, India
10–14 September 1990

Representatives from over 100 developing countries and more than 50 external support agencies will meet in New Delhi, India for a special four-day consultation hosted by the Government of India and sponsored by the United Nations Development Programme (UNDP).

The goal is to draw from the lessons of the International Drinking Water Supply and Sanitation Decade in order to formulate new guidelines and action plans for the 1990s.

The meeting will focus on:

- national planning for expansion of rural and urban water and sanitation services
- management of water resources and the environment
- new sustainable, low-cost technologies
- community participation, motivation and education
- human resources development, including the role of women
- financial resource mobilization.

Participation is by special invitation to government planners, finance and sector specialists, and external support agencies, including non-governmental organizations.

For further information, please contact:

Safe Water 2000

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Safe Water 2000
United Nations Development Programme
One United Nations Plaza, Room FF-1268
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